




## Flammable Storage In Lab Refrigerators and Freezers

Storage of hazardous materials in laboratory refrigerators and freezers can create a variety of safety challenges, including ensuring compatible chemical storage, preventing spills, and minimizing the accumulation of hazardous vapors inside units from volatile materials. In the confined environment of these units, it is possible for vapors from flammable materials to reach the lower explosive limit concentration; unshielded wiring or the unit’s compressor can then provide a source of ignition and initiate a fire or explosion. Many labs have had such incidents result from storing flammable materials in units that are not appropriate for these items. As such, it is important to understand key differences and appropriate uses of units, ensure they are appropriately labeled, and that materials are stored properly, particularly flammable materials.

### Types of Refrigerators/Freezers

|  | Conventional Units   | Flammable Storage Units   | Explosion Proof Units   |
|--|--|---|---|
|  |                     |                  |    |
| <b>Purpose</b>                               | Domestic use.  | Storage of flammable materials in non-hazardous environments.                                       | Storage of flammable materials in potentially explosive environments.   |
| <b>Electrical Configuration</b>              | Compressor and other units that can generate a spark are located on the <b>INSIDE</b> of refrigerator. | Compressor and other units that can generate a spark are located on the <b>OUTSIDE</b> of the unit. | Compressor and other units that can generate a spark are located on the <b>OUTSIDE</b> of the unit and are <b>SEALED</b> to protect them from explosive vapors that could be in the room. |
| <b>Okay to store flammable chemicals?</b>    | NO   | YES   | YES   |
| <b>Okay to use in hazardous environment?</b> | NO   | NO  | YES   |
| <b>EH&amp;S Labelling Requirements</b>       | “Lab Use Only<br>No Food - No Drink”<br>“Attention! Not for Flammable Storage”                         | “Lab Use Only<br>No Food - No Drink”<br>“Warning Keep Fire Away”                                    | “Lab Use Only<br>No Food - No Drink”<br>“Warning Keep Fire Away”  |

**Conventional units** are designed for domestic use and are not suitable for storing flammable materials. These units are not intrinsically safe and can provide a source of ignition both inside and outside of the unit. Generally, these units are not suitable for lab environments, however, they may be used for storage of aqueous solutions, non-hazardous materials, and biological samples.

**Flammable storage units** are designed to store flammable materials in non-hazardous exterior environments. These units have intrinsically safe interiors to shield the contents from sources of ignition. The exterior of these units are not intrinsically safe and can serve as a source of ignition if the external atmosphere has sufficient flammable vapor concentration. These units are listed by UL as special-purpose refrigerators or freezers intended for flammable material storage in accordance with NFPA 45 and 99.

**Explosion-proof units** are designed for flammable materials storage in areas where the atmosphere outside of the unit could accumulate explosive flammable vapor levels (e.g., solvent dispensing rooms). These units are intrinsically safe both inside and outside. Such units must meet the requirements for Class 1, Division 1 Electrical Safety Code (NFPA 45 and 70) and require direct wiring to the power source via a metal conduit. Explosion-proof units are significantly more expensive than units which are just rated for flammable storage. Explosion-proof units are typically not necessary for most labs on campus, but are required in intrinsically safe high hazard rooms.

## Safe Handling and Storage

Chemicals stored inside freezers and refrigerators should be sealed with a cap, labeled, and stored upright to avoid leakage or spilling. If chemicals are stored in the door shelves, secondary containers or some other barrier should be used to keep them from falling out when the door is opened. Strong oxidizing agents should be separated from flammable, combustible, and organic materials by placing in secondary containment. Compressed gases should never be stored in freezers and/or refrigerators.

It is important to periodically remove ice buildup from freezers because ice buildup can cause the freezer compressor to fail. Compressor failure can result in a fire, spills of hazardous materials (as items thaw and potentially leak), and/or loss of samples. In addition, ice buildup can also make it difficult to remove containers from the freezer, and trying to free a frozen-in container can lead to injuries and/or chemical exposures. You can refer to the [\*\*Freezer Defrosting Fact Sheet\*\*](#) on the EH&S website for guidance regarding this process.

## Labeling

Regardless of the type, each lab freezer and refrigerator should be labeled to indicate whether it is or is not appropriate for flammable material storage. Conventional units should be labeled as “Attention! Not for Flammable Storage” and both explosion-proof and flammable materials storage units should be labeled as “Warning Flammable Storage Keep Fire Away.” Food and drink should not be stored or consumed in laboratory areas. As such, every lab refrigerator and freezer needs to be labeled with a “laboratory use only no food – no drink” label. All labels are available at the end of this document. Consider laminating the label or using a sheet protector to keep the label in good condition. Replace labels that become illegible.

For questions or more information please contact

EH&S (413) 545-2682

**LABORATORY USE ONLY  
NO FOOD - NO DRINK**



**WARNING**

**FLAMMABLE MATERIALS STORAGE**

**KEEP FIRE AWAY**



**ATTENTION!**

**NOT FOR FLAMMABLE  
STORAGE**